A CONTRIBUTION TO THE PATHOLOGY OF THE SPINAL CORD IN DIVER'S PALSY.

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AUTOPSIES on the remains of those who have died as the result of Diver's Palsy or Caisson Disease are quite rare, and so far as the limited amount of literature to which I have access goes, I only find mention of two examinations of the spinal cord in such cases. Such is my excuse for presenting this paper, the result of the case mentioned below, whose cord I have obtained through the kindness of Dr. J. B. Eagleson. Dr. F. H. Coe has prepared the sections from which I have made the diagrams.

My case does not reveal anything new, nor does it offer ground for any new theories. It is only intended to add one more case to support already existing ideas and theories. The autopsy was not complete, for only the spinal cord was examined.

CASE.—J. C. had followed, off and on, deep-water diving. For two weeks prior to the commencement of his trouble he had been diving to the depth of two hundred and ten feet, protected by the ordinary diving suit and helmet, and often remaining under water for thirty minutes. On April 26, 1893, he dove for the fifth time, coming up sooner than usual. So soon as the helmet was taken off, he complained of sharp pains in his arms and legs, and almost at once became unconscious, in which condition he remained for about an hour and a half.

In two hours, he was first seen by Dr. Merkel, with whom I afterwards saw the case, and from whom I obtained the history. After again becoming conscious, he complained of neuralgic and shooting pains down his arms to his fingers, which were much increased by change of position. No pains were now mentioned in his legs. His arms and legs were paralyzed for motion, while some sensation remained in the arms, though it was completely gone in the legs. Both the bladder and rectum were paralyzed. Anæsthesia existed from the neck down.

His wife applied hot irons around his feet and legs as soon as he arrived home, burning and blistering them. These never healed. In two weeks a cough developed. Examination of the chest showed mucous rales, some dullness posteriorly in each lung. There was some muco-purulent expectoration.

In May, he had a chill and consequent rise of temperature to 102°, which lasted for two days, again gradually falling to normal. Intestines were distended, and passages came only artificially. There was incontinence of urine and cystitis. Bed-sores began to form early, and at the time of his death there was one large one ten (10) inches wide over the sacrum extending to the bone, one over each trochanter, two small ones on th espine, and one on the under surface of each elbow. He remained conscious up to the time of his death, excepting the delirium of the fever just preceding his death, when his temperature reached 104°, depending, no doubt, on a septic state induced by his bed-sores, which were then extending rapidly, and the cystitis. Fortwo weeks just prior to his death he was absolutely free from pain. Tendon reflexes in the arms and legs were gone. The paralysis never decreased any, but did increase some in the latter stages of the disease. There had been a small amount of motion in the fingers of each hand, but this, too, left him. Skin reflexes were absent; sensation returned as far down as Poupart's ligaments.

At the autopsy made July 4, 1893, owing to circumstances not avoidable, only the cord was opened, which was removed posteriorly, and during its removal nothing abnormal was noted in its surroundings, and only a softness in the cervical parts of the cord. It was then placed in Müeller's fluid for preliminary hardening, sections being made to facilitate the process, and then it was noticed that the tissues of some areas were so soft that they were almost creamy in consistence, requiring the most careful manipulation to preserve the cord at all. In ten days the sections of the cord were taken out for microscopical purposes and transferred to new hardening and embedding material, and then it was noted that practically all the lesions were in the cervical and upper dorsal region. Three sections were made of the cervical, four of the dorsal, and only one of the lumbar. The autopsy was not made till thirty-six hours after death, and so it was impossible to do much cellular work on the cord, as a consequence of which attention has been paid only to the regional condition.

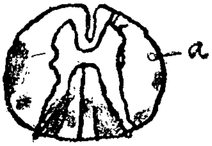

Fig. 1.

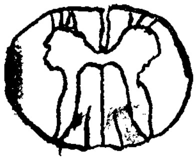

Fig. 2.

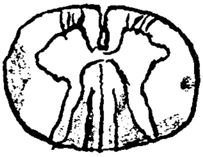

Fig. 3.

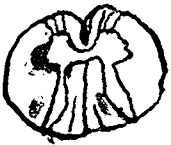

Fig. 4.

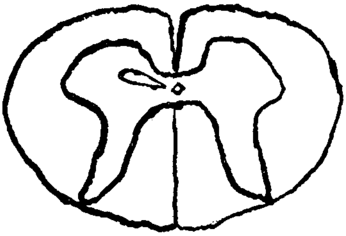

Fig. 5.

The figures Nos. 1, 2 and 3 are diagrams made from the microscopical appearance of the cervical cord sections, and No. 4 from the first dorsal section. In figure 1, will be noted the areas involved as follows, viz.: The posterior root zones, or columns of Burdach, had on either side largely dropped out in the preparation, and the surrounding areas that are indicated show the extent to which softening has occurred.

In many of the nerve fibres around these regions the axis-cylinders are swollen. The blood-vessels are engorged here as in other areas of the same section. In either column of Goll are small broken-down areas. In the left lateral column are seen one vacuole (*a*) and one broken-down area lying posterior to it. In the right lateral, or mixed lateral, tract is one large broken-down patch. On this side, the fibres running from the gray matter to the surface of the cord posteriorly are broken up in their course.

In the second section, taken an inch below the first one, are the same conditions found, but more extensive in area. However, the column of Goll shows but little on the left side. The left root zone is all gone to an extent more than half way to the commissure, and with it has gone a part of the root fibres. At this level alone appears an inflammatory change of very small extent of the direct cerebellar and lateral pyramidal tracts, and the same in the mixed lateral. On the right side the change in the mixed lateral is extensive. The posterior roots are broken down on the side adjoining the column of Burdach, which latter is destroyed completely half-way up to the commissure, with one-half that of the column of Goll.

In the third section, taken an inch and a half below the preceding one, all the areas of changed tissue have diminished very much in extent. The left column of Goll shows a broken-down area, and that of Burdach more so. The roots are free, as is the rest of this side of the cord. On the right side there is a small area of the mixed lateral gone, and of the column of Burdach next to the roots.

In the first dorsal section (No. 4) are found very small areas of degeneration in the right column of Burdach and in the right direct cerebellar tract. In the remaining sections no regional changes are found. In the gray matter only one change was noted. In the base of the right upper horn is a cavity of the shape outlined in figure 5, which is constant throughout the length of the cord, varying in size at different levels. To this cavity there is a distinct limiting membrane. It is of sufficient size to be easily followed with the naked eye.

Throughout the cord, but more especially in the lower posterior positions, can be seen some very large blood-vessels, two of which cut transversely across look like small hemorrhages to the naked eye. These two are on the right side in the posterior lateral region.

In some way, possibly from the pressure and its rapid changes, a number of hemorrhages probably occurred in the cervical cord, and, as a result of these, there came secondary softening and inflammatory changes of the different columns that have been involved. Yet all traces of hemorrhages have disappeared, but it was two months and six days from the onset of his trouble till his death. And again, from the fact that the largest amount of present degeneration is found here, I would infer that the original lesions had been most extensive at this level, and it is barely possible that the lesions at the other levels may be secondary to this one. On the contrary, though, the irregular distribution of the degeneration areas of one level as compared with those of another, is against this idea.

The fact that a helmet was worn may be worthy of consideration in attempting to formulate an idea of the selection of the cervical region for all the lesions. Yet I am not familiar enough with these cases to know if cases of palsy from diving in a diving suit differ from cases of palsy arising from work in a caisson.

The cavity in the gray matter does not seem to bear any relation to the disease at all, and this idea is strengthened by its lining membrane. The first rise of temperature, I take it, marked the onset of the myelitis.

Anti-Toxine in the Treatment of Trismus and Tetanus Neonatorium.—The method of treating trismus and tetanus neonatorium as recommended by Tizzoni has been recently successfully employed by Prof. Escherich. The antitoxine was used in four cases, in three the infection was so great that death ensued from septic pneumonia, but in the fourth case after the second injection the spasms ceased and the patient recovered entirely in a short time.

(*Medicinisch-chirurgische Rundschau*). B. M.